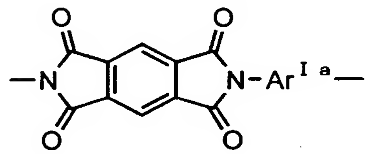
CLAIMS

1. A polyimide film comprising

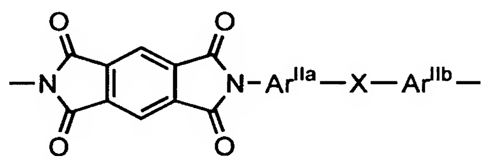
a structural unit of the following formula (I) at between 30 mole percent and 99 mole percent:



(I)

[wherein Ar^{Ia} is 1,4-phenylene optionally having a non-reactive substituent], and

a structural unit of the following formula (II) at between 1 mole percent and 70 mole percent:



(II)

(wherein Ar^{IIa} and Ar^{IIb} are each independently a C6-20 aromatic group optionally having an non-reactive substituent, and X in structural unit (II) consists of at least one group selected from among groups of the following formula (II-i):

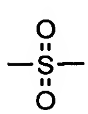
-O- (II-i)

the following formula (II-ii):

$—O-Ar^{IIc}—O—$ (II-ii)

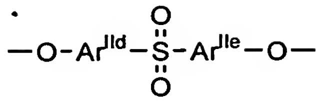
[wherein Ar^{IIc} is a C6-20 aromatic group optionally having a non-reactive substituent],

the following formula (II-iii):



(II-iii)

and the following formula (II-iv):



(II-iv)

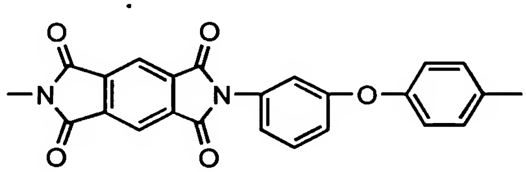
[wherein Ar^{IId} and Ar^{IIe} are each independently a C6-20 aromatic group optionally having a non-reactive substituent], the polyimide film being characterized by having two perpendicular directions in which the in-plane Young's modulus is 3 GPa or greater, and having a moisture absorptivity of no greater than 3.3 wt% at 72% RH, 25°C.

2. A polyimide film according to claim 1, characterized in that X in structural unit (II) is represented by formula (II-i), with 40-70 mole percent of structural unit (I) and 30-60 mole percent of structural unit (II).

3. A polyimide film according to claim 1, characterized in that X in structural unit (II) consists of at least one group selected from among groups of formulas (II-ii), (II-iii) and (II-iv), with 70-95 mole percent of structural unit (I) and 10-40 mole percent of structural unit (II).

4. A polyimide film according to claim 1, characterized in that the imide group concentration, [imide] of the polyimide used is 5.7-6.2 eq/kg.

5. A polyimide film according to claim 2, characterized in that structural unit (II) is a structure represented by the following formula (II-a):



(II-a)

6. A polyimide film according to claim 1, characterized in that the tensile strength in one direction is 150 MPa or greater.

7. A polyimide film according to claim 1, wherein the imide group fraction of the polyimide is 95% or greater.

8. A film-forming process of a polyimide film characterized by comprising the following steps:

• Step 1: A step in which (A) pyromellitic anhydride, (B) an aromatic diamine compound represented by the following formula (III):

$$H_2N-Ar^{Ia}-NH_2 \qquad (III)$$

[wherein Ar^{Ia} is 1,4-phenylene optionally having a non-reactive substituent],

and (C) an aromatic diamine compound represented by the following formula (IV):

$$H_2N-Ar^{IIa}-X-Ar^{IIb}-NH_2 \qquad (IV)$$

(wherein Ar^{IIa} and Ar^{IIb} are each independently a C6-20 aromatic group optionally having an non-reactive substituent, and X consists of at least one group selected from among groups of the following formula (IV-i):

$$-O- \qquad (IV\text{-}i)$$

the following formula (IV-ii):

$$-O-Ar^{IIc}-O- \qquad (IV\text{-}ii)$$

[wherein Ar^{IIc} is a C6-20 aromatic group optionally having a non-reactive substituent],

the following formula (IV-iii):

$$-\overset{\displaystyle O}{\underset{\displaystyle O}{\overset{\|}{\underset{\|}{S}}}}- \qquad (IV\text{-}iii)$$

and the following formula (IV-iv):

$$-O-Ar^{IId}-\overset{\displaystyle O}{\underset{\displaystyle O}{\overset{\|}{\underset{\|}{S}}}}-Ar^{IIe}-O- \qquad (IV\text{-}iv)$$

[wherein Ar^{IId} and Ar^{IIe} are each independently a C6-20 aromatic group optionally having a non-reactive substituent],

are reacted in a solvent in proportions simultaneously satisfying the following inequalities (1) and (2):

$$0.95 \leq a/(b+c) \leq 1.05 \qquad (1)$$

$$0.01 \leq c/(b+c) \leq 0.70 \qquad (2)$$

[wherein a is the number of moles of pyromellitic anhydride, b is the number of moles of the aromatic diamine compound

represented by formula (III) above, and c is the number of moles of the aromatic diamine compound represented by formula (IV) above]

to obtain a polyamic acid solution;

Step 2: A step of reacting the obtained polyamic acid solution with a dehydrating agent to form a gel film wherein at least a portion of the polyamic acid is converted to polyisoimide;

Step 3: A step of biaxially stretching the obtained gel film;

Step 4: A step of heat treating the obtained biaxially stretched film.

9. A film-forming process of a polyimide film according to claim 8, characterized in that in Step 2, acetic anhydride as dehydrating agent and an organic amine are added to the polyamic acid solution prepared in Step 1 to obtain a polyamic acid composition which is then cast onto a support and subjected to warming/heat treatment for dehydration reaction to form a gel film wherein at least a portion of the polyamic acid is converted to polyimide or polyisoimide.

10. A film-forming process of a polyimide film according to claim 8, characterized in that in Step 2, the polyamic acid solution prepared in Step 1 is cast onto a support to obtain a film, and the obtained film is dipped together with the support into an isoimidating solution comprising the same solvent as in Step 1 and acetic anhydride as dehydrating agents and an organic amine, to form a gel film wherein at least a portion of the polyamic acid is converted to polyisoimide.

11. A film-forming process of a polyimide film according to claim 8, wherein the isoimide group fraction of the gel film obtained in Step 2 is 90% or greater.

12. A film-forming process of a polyimide film according to claim 8, wherein the gel film supplied for biaxial stretching in Step 3 has a swelling degree of 200-10,000%.

13. A film-forming process of a polyimide film according to claim 8, wherein the heat treatment of Step 4 is carried out at a constant length or under tension, at a temperature of 250-650°C.

14. A metal wiring circuit board comprising a polyimide film according to claim 1.

15. An LOC tape comprising a polyimide film according to claim 1.